

Accessibility and Utilization of Telemedicine in Ontario

Telemedicine uses information technology to provide clinical health care to patients. In Ontario, telemedicine has been used since the 1970s to overcome geographic barriers to accessing health care. The Ontario Telemedicine Network (OTN), a not-for-profit organization funded by the Ministry of Health and Long Term Care (MOHLTC), has facilitated telemedicine in Ontario since 2006. OTN is the largest telemedicine provider in Canada and one of the largest in the world.

OTN units are located in hospitals, nursing stations, medical clinics, public health units, long-term care facilities and doctor's offices. A patient in one community "sees" a health care provider in another community using a secure and private videoconferencing network. X-rays, other images and sounds (heart beat) can also be shared over the network.

This issue of *Research in FOCUS on Research* reports our findings on two aspects of telemedicine in Ontario. First, we used driving distance to measure how close Northern Ontarians were to their nearest OTN unit. Next, we analyzed Ontario Health Insurance Plan (OHIP) data to see how frequently OTN was being used, where patients were located, and the most common types of health care that patients accessed through telemedicine.

Where are OTN Units?

In July 2014, there were 2,026 units in Ontario. One quarter of these were in Northern Ontario, which has just 6% of the province's population. Just over half of Northern Ontario units were located in rural areas.

Figure 1: Map of OTN Units in Northern Ontario with Highway and Railroad Networks



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Table 1: Number of OTN Units in Northern and Southern Ontario

	Northern Ontario	Southern Ontario	Ontario Total
Urban	266 (48%)	1211 (82%)	1477 (73%)
Rural	286 (52%)	263 (18%)	549 (27%)
Total	552 (100%)	1474 (100%)	2026 (100%)

How Close are Northerners to an OTN Unit?

We used data from the Ministry of Natural Resources (MNR) to identify communities in Northern Ontario. There were 802 communities in total, 54% of them with a population of less than 50 people. About 10% of communities were located in urban areas, as defined by Statistics Canada’s Census Subdivisions and 90% of communities were located in rural areas.

Many Northern Ontario communities contained multiple OTN Units. For instance, there were 66 units in Thunder Bay and 62 units in The City of Greater Sudbury. Communities with a population of 1,000 to 10,000 averaged 3.4 OTN units. Communities with populations of 50 to 1,000 averaged 0.3 units. However, many of the smaller communities that do not contain OTN units are close to a community with at least one OTN unit.

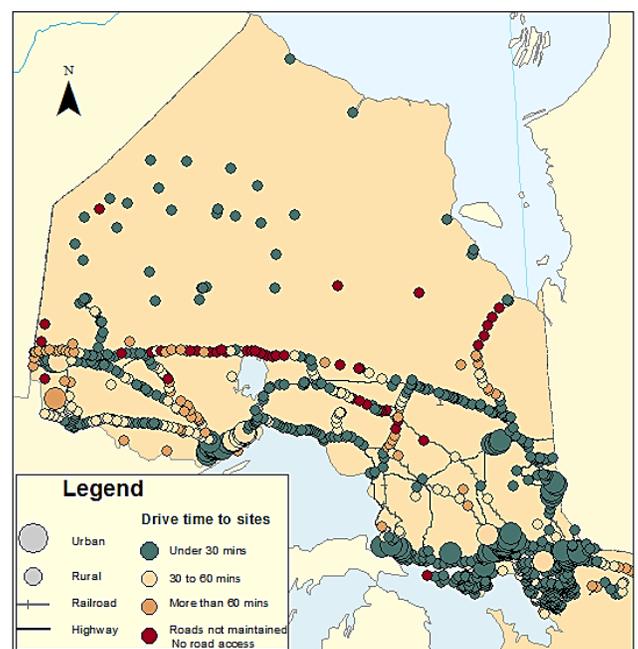
We used road networks and speed limits to calculate the drive time from the centre of each Northern Ontario community to the nearest OTN Unit. We grouped drive times as 30 minutes or less, 30 to 60 minutes, more than 60 minutes, or no road access. Our analysis estimates the maximum potential access in order to help understand how OTN can be used to provide clinical services in medically underserved regions. This analysis assumed that OTN units were available for clinical use, residents had access to a private vehicle and that weather conditions were suitable for driving.

Table 2: Drive Time from Northern Ontario Community to Nearest OTN Unit

	Urban	Rural	Total
Less than 30 minutes	72 (91%)	466 (64%)	538 (67%)
30 to 60 minutes	7 (9%)	145 (20%)	152 (19%)
More than 60 minutes	0	70 (10%)	70 (9%)
No road access	0	42 (6%)	42 (5%)
Total	79 (100%)	723 (100%)	802 (100%)

All urban communities in Northern Ontario were within an hour’s drive of an OTN unit, compared to 84% of rural communities. Another 10% of rural communities were more than an hour from an OTN unit and 6% were not connected to OTN units by road. These were fly-in communities or connected only by train.

Figure 2: Drive Time to OTN Units from Northern Ontario Communities

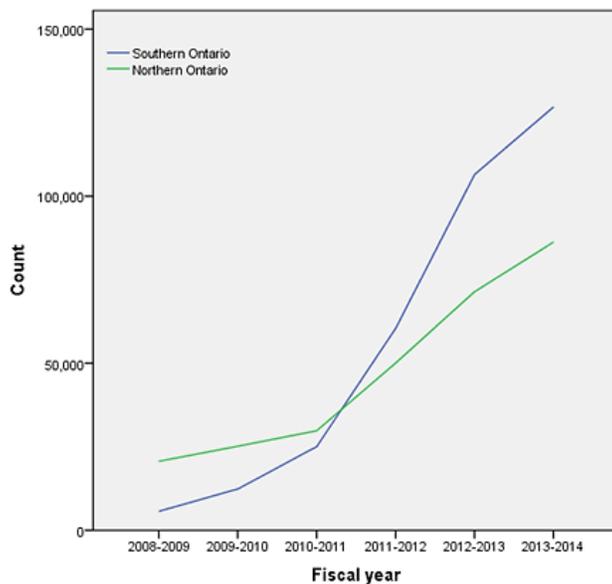


How Often is Telemedicine Used in Ontario?

In order to calculate how much OTN is used in Ontario, we obtained OHIP billing data from the Ministry of Health and Long Term Care (MOHLTC).

There were 732,388 OTN patient visits during our study period. Of these, 89% were completed patient visits, 11% were missed or cancelled appointments and only 0.2% were dropped due to technical difficulties. The rates for missed OTN appointments are comparable to missed in-person visits. The low rate of technical difficulties suggests that OTN technology is working as it should.

Figure 3: Number of OTN Patient Visits

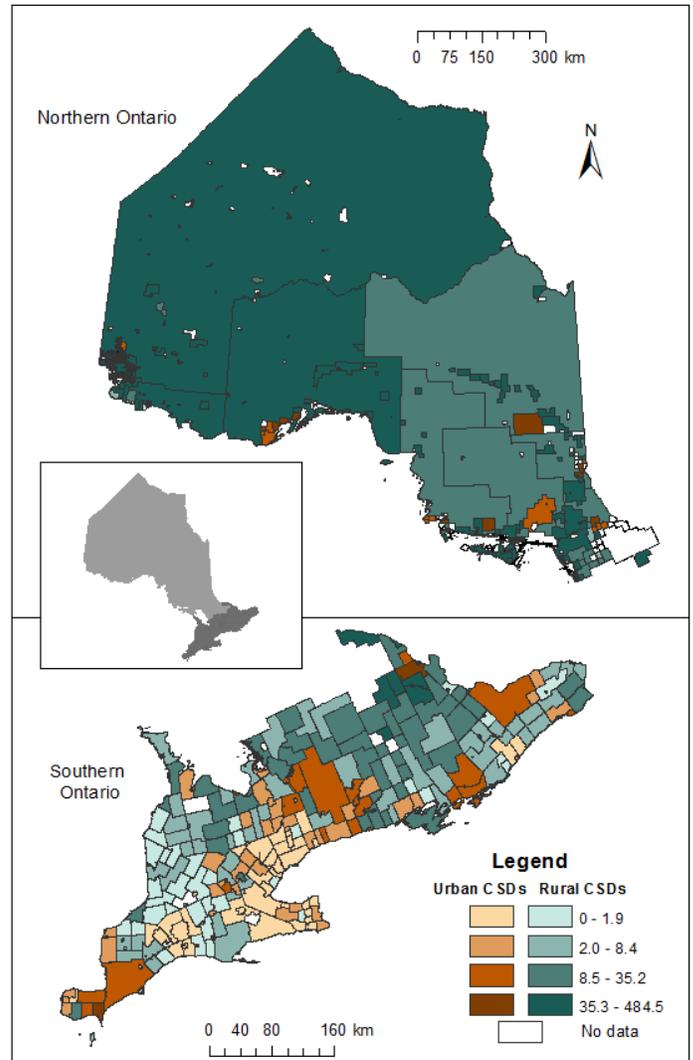


The total number of visits increased from 27,409 in 2008/09 to 221,353 in 2013/14. While utilization increased in all regions, the increase was most noticeable in Southern Ontario. In 2008/09, 75% of OTN visits were with patients from Northern Ontario. By 2013/14, Northern Ontario patients made up only 39% of all visits.

What is the Rate of Use?

We calculated rate of use per 1000 people in each census subdivision (CSD) in Ontario. The rates varied widely from 0 to 485 visits per 1000 people per year (Figure 4).

Figure 4: Use per 1000 People



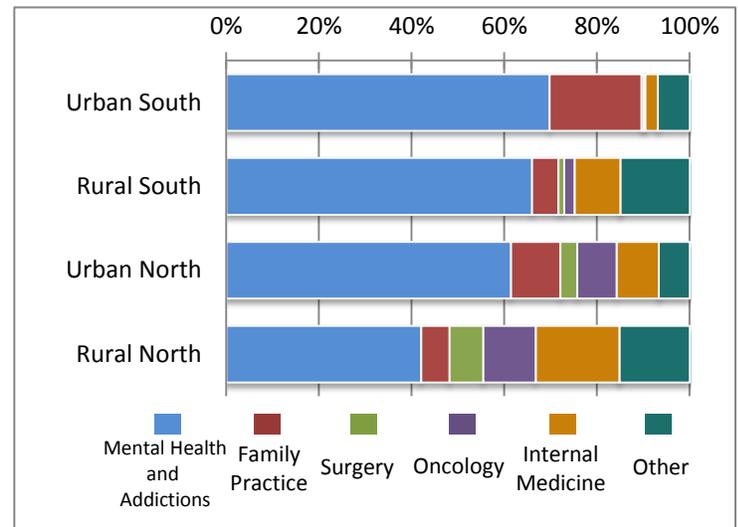
The median utilization rate can be more informative than the average rate, especially when the range is wide, as it is in our study. The median is the halfway point: half of the CSDs have a lower rate and the other half have a higher rate.

Median utilization rate for rural CSDs in Northern Ontario was highest at 52 visits per 1000 people per year. Northern Ontario urban areas had 32 visits. Southern Ontario was much lower, with 6 visits per 1000 people per year in rural areas and 3 in urban areas.

Rates May be Underestimated

OHIP data may slightly underestimate the total number of events, as billing records may not capture visits with physicians who use alternative payment programs or who are salaried. It also would not capture visits with other health care professionals, such as nurse practitioners, or visits that are not clinically billable, such as physicians consulting with other physicians. Telemedicine services to First Nations communities, such as services provided by Keewaytinook Okimakanak Telemedicine and OTN, are not usually included in OHIP records. Still, billing records do capture the majority of virtual care services in Ontario.

Figure 5: Types of Care by Patient's Location



Which Medical Services Occur via OTN?

OTN is used most often for mental health and addictions services (62%). It is also used for many other types of clinical care, especially in the rural north, where 58% of utilization is in other types of care such as family practice, internal medicine, oncology and surgery (typically pre or post-operative consultations).

These data suggests that in regions where there are the fewest specialist services available, OTN is used for a wider range of medical services than in regions where specialist services are geographically closer to home.

Conclusion

We have discovered two things so far. The first is that OTN units are readily available in Northern Ontario and the second is that Ontarians are using a broad variety of medical services via telemedicine. Ontario is leading the way in providing telemedicine services to meet the medical care needs of its residents. Ongoing research is exploring whether men and women use different telemedicine services or whether use changes with age.

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